SEMESTER END EXAMINATION APRIL-MAY, 2026

Course Name: - B.TECH. Hons.(CSE with AI&DS) **Semester:- IV**

Paper Name: - STATISTICAL ANALYSIS AND COMPUTING **Paper Code:- NAD-405**

Time - 3 Hrs + 20 minutes per hour extra time for V.I. & examinees with writer. **Max Marks-70**

समय– 3 घण्टे. 20 मिनट प्रति घंटे अतिरिक्त–दृष्टिबाधित एवं सह लेखक परीक्षार्थियों के लिए। अधिकतम अंक–70

Instructions:

- The question paper consists of three sections namely A, B, C. All sections are compulsory.
- Section A- Each question carries **3 mark. All questions are compulsory**.
- Section B- Answer any **5 out of 7** given questions. Each question carries **7 marks**.
- Section C- Answer any **2 out of 3** given questions. Each question carries **10 marks**.

निर्देश:

- प्रश्न पत्र में तीन खण्ड अ, ब, व स हैं। सभी खण्ड अनिवार्य हैं।
- खण्ड–अ में प्रत्येक प्रश्न तीन अंक का है। सभी प्रश्न अनिवार्य हैं।
- खण्ड–ब में सात प्रश्नों में से किन्हीं पाँच प्रश्नों के उत्तर दें। प्रत्येक प्रश्न सात अंक का है।
- खण्ड–स में तीन प्रश्नों में से किन्हीं दो प्रश्नों के उत्तर दें। प्रत्येक प्रश्न 10 अंक का है।

Section – A (खण्ड–अ)

Multiple Choice Questions (बहुविकल्पीय प्रश्न)

1. Answer all the following questions. 5x3 =15

निम्नलिखित सभी प्रश्न अनिवार्य हैं।

i) Which is the most reliable measure of dispersion?
A) Range
B) Mean deviation
C) Standard deviation
D) Quartile deviation

ii) Positive skewness means:
A) Tail on left side
B) Tail on right side
C) No tail
D) Symmetric

iii) If r = +1, it indicates:
A) No correlation
B) Perfect negative correlation
C) Perfect positive correlation
D) Weak correlation

iv) In Time Series Analysis. Seasonal variation occurs within:
A) Years
B) Centuries
C) Decades
D) Months/quarters within a year

v) If the correlation coefficient between two variables is zero, the regression lines are:
A) Coincident
B) Perpendicular
C) Parallel
D) Intersecting at 45°

Section - B ,खण्ड–ब)

Short Answer Questions (लघूत्तरीय प्रश्न)

2. Answer any five of the following questions. 5x7=35
निम्नलिखित में से किन्हीं पाँच प्रश्नों के उत्तर दें।

i. Derive the relationship between mean deviation and standard deviation.
Under what condition are they equal?

ii. Find the MODE of the following series by GROUPING METHOD

Size:	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
F(x):	48	52	56	60	63	57	55	50	52	41	57	63	52	48	40

iii. What is the coefficient of variation (CV)?
How is it used to compare variability across different datasets? Illustrate with a hypothetical example.

iv. The following distribution shows the daily wages (in ₹) of 200 workers in a factory.

Daily Wages (₹)	50–100	100–150	150–200	200–250	250–300	300–350
No. of Workers	20	35	60	45	30	10

Calculate:
1) Arithmetic mean
(using assumed mean method)
2) Median
3) Mode
4) Seventh Decile
5) Eighty Third Percentile

v. Set up an analysis of variance table for the following per acre production data for three varieties of wheat, each grown on 4 plots and state if the variety differences are significant.

Plot Of land	Per acre production data		
	Variety of wheat		
	A	B	C
1	6	5	5
2	7	5	4
3	3	3	3
4	8	7	4

vi. From the data given below compute the regression equations by the method of least squares. Plot the two regression lines and from the graph obtain a value of X when Y is 110 and a value of Y when X is 23. Verify the result algebraically.

X:	10,	15,	35,	40,	50
Y:	100,	90,	110,	80,	120

vii. Discuss how a data analyst can integrate statistical analysis techniques with Artificial Intelligence to enhance decision-making and predictive modelling.

Section - C (खण्ड–स)

Descriptive Questions (विवरणात्मक प्रश्न)

Answer any two of the following question. 2x10=20

निम्नलिखित में से किन्हीं दो प्रश्नों के उत्तर दें।

i) From the table given below calculate the coefficient of Correlation between the ages of fathers and daughters

Age of Father	Age of Dughter								Total
Years	2	6	10	14	18	22	26	30	
55-60						6	5	3	14
50-55					8	10	6	2	26
45-50				2	13	8	4		27
40-45				14	18	3			35
35-40			15	20	8				43
30-35	6	12	25	16					59
25-30	15	26	20	1					62
20-25	22	10	2						34
	43	48	62	53	47	27	15	5	

ii) Explain following Basic concepts in the context of testing of hypotheses

(a) Null hypothesis and alternative hypothesis

(b) The level of significance

(c) Decision rule or test of hypothesis

(d) Type I and Type II errors

(e) Two-tailed and One-tailed tests (also draw curve :

Given Z = mod(1.96) for 25% and Z = mod(1.645) for 50%)

iii) Weight of 10 students is as follows:

S NO	1	2	3	4	5	6	7	8	9	10
Weight (kg)	38	40	45	53	47	43	55	48	52	49

Can we say that the variance of the distribution of weight of all students from which the above sample of 10 students was drawn is equal to 20 kgs? Test this at 5 per cent and 1 per cent level of significance.